# NOTE I.

# ZOOLOGICAL RESULTS OF THE DUTCH SCIENTIFIC EXPEDITION TO CENTRAL BORNEO.

## INTRODUCTION

BY

**Dr. J. BÜTTIKOFER.**

(With a map).

The following lines are intended to serve as an introduction to a series of articles which will treat, under the above mentioned general title, of the zoological collections made during the latest Dutch explorations in Western and Central Borneo [1]).

Early in the year 1893 the Society for the advancement of Natural history exploration in the Dutch Colonies (Maatschappij ter bevordering van het Natuurkundig onderzoek der Nederlandsche Koloniën) decided to send out, with the aid and under the protection of the Colonial Government, a scientific expedition to Dutch West-Borneo.

---

[1]) The following papers on the zoological collections of the Expedition have already been published in previous volumes of this periodical:

- R. Horst, on a large Earth-worm from Borneo. Vol. XVI, pp. 137—144, pl. 7.
- F. A. Jentink, some remarks concerning the Orang oetan. Vol. XVII, pp. 17—18.
- J. C. C. Loman, on some Land-planarians of the genus *Bipalium* (*Bipalium expeditionis*). Vol. XVII, p. 82.
- C. Ritsema Cz., the Lucanoid Coleoptera of the Dutch Scientific Borneo-Expedition. Vol. XVII, pp. 133—140.
- M. M. Schepman, the Mollusca of the Dutch Scientific Borneo-Expedition. Vol. XVII, pp. 145—162, plates 2—4.
- C. Ritsema Cz., new species of the Melolonthid genus *Apogonia*. Vol. XVIII, pp. 25—32.
- M. M. Schepman, on *Unio infrarostratus*. Vol. XVIII, p. 140.

With the geological part of the researches the Society charged Prof. Molengraaff at Amsterdam, with the botanical part Dr. Hallier, at that time Assistant of the Botanical Institute at Buitenzorg (Java), while I had the honor of being entrusted with the zoological part in its whole extent. The medical care of the expedition was placed in the hands of Dr. Nieuwenhuis, a surgeon in the Colonial Military service, who at the same time undertook the study of the Anthropology and Ethnography of the natives.

Our principal task was to explore the basin of the Kapoeas River [1]) and to proceed from there, if circumstances should prove favorable, along the Mahakkam River to Samarinda on the east-coast of the island.

In order not to interfere too much with the different special tasks of the expedition, the Society very wisely decided to give each member of the party the utmost possible liberty as to the choice of his special exploring territories and as to the time to be expended upon them, though without entirely leaving out of sight the character of the expedition as a whole. This measure undoubtedly contributed greatly to the success of the different divisions.

The Geologist does not need, as a rule, to make very long stays at one and the same place; his task, on the contrary, being to travel continually and to visit as many different places as possible so as to get a clear idea of the geological structure of the country. The Zoologist, however, and in a not less degree also the Botanist, are obliged to spend a considerable time in one certain well-adapted and restricted locality. Collecting, preparing and preserving botanical and still more zoological objects not only require

---

1) All the geographical names in the letterpress and the accompanying map are written in Dutch, and consequently *oe* must be pronounced like *uh*.

very much time, but also a considerable and rather voluminous outfit, the removing of which is very expensive, and a suitable place for preparing and storing up the objects, protected from moisture and other deteriorating influences, until a chance presents itself for sending them off. Moreover the Zoologist must know his territory in order to have it thoroughly explored. A temporary residence in a native village will secure him the advantage of making use of native huntsmen and children in his collecting work. In making use of their original methods of shooting, snaring and trapping mammals and birds, of fishing, and collecting insects, many rare and interesting objects will be obtained, which otherwise might have escaped the attention of the collector altogether.

The same rule has to be followed by the Anthropologist and collector of ethnographical objects, who will never attain complete success unless he settles his abode in a place peopled by natives, with whom it generally takes some time to get on a certain footing of intimacy.

After these general principles I will try to give my readers a concise description of our field of exploration.

The Kapoeas River 1) running in a westerly direction right along the equator to the Indo-Chinese Sea, is undoubtedly the largest of all the rivers in Borneo. With its numerous tributaries it drains an area of about 1800 square geographical miles, and its length, as the crow flies, is about 80 geographical miles, while, measured along its windings, it has a length of 150 miles. The sources of the Kapoeas and its most important tributaries are to be found in the mountain-region of the far interior. In the north-west we find the mountain-region of Sambas, the most prominent peaks of which being Mount Nioet (1701 meter) and Mount Semedoem (1118 meter) above the level of the sea, feeding the Landak River which falls

---

1) Another much smaller river of this name runs parallel with the Barito River and westward of the latter, in Southern Borneo.

into the Kapoeas at a short distance above Pontianak. More to the east the peaks gradually become lower, the last prominent and somewhat isolated ones being Mount Kenepai and Mount Toetoep, west of the Batang Loepar Lake-region. At the north of that Lake-region the elevation, separating the Kapoeas-basin from that of the Batang Loepar River, does not rise much higher than 50 meter above the level of the sea.

East of the Lake-region we have to deal with a new mountain-region of considerable height, one of the highest peaks of it being Mount Lawit (1870 meter). This enormous range, forming the northern and north-eastern frontier of the Upper Kapoeas-basin, and at the same time the frontier between Dutch territory and that of Sarawak, sends down, in a southern direction, a great number of important northern tributaries of the Kapoeas, the largest of which are the Embalau-, the Palin-, the Sibau- and the Mendalam Rivers.

The Kapoeas River itself has its source in a very distant north-eastern corner of this mountain-range, and after a wild course, forming innumerable rapids and falls, it reaches the vast plain at some distance above Nanga Era, after having received from the East two large tributaries: the Boengan- and the Keriau Rivers. From Nanga Era the river proceeds rather slowly, forming a number of serpentines, through the plain, which has, at Poetoes Sibau, an elevation of only 50 meter above the sea. At Poetoes Sibau, where the Controleur of the Upper Kapoeas came to reside a short time ago, the Kapoeas has a width of 208 meter., and small steamers can easily reach this place and even proceed to the Mendalam River when the water is not very low. About 10 English miles below Poetoes Sibau, the Kapoeas is joined by the Mandai River, a southern tributary, draining a large mountain-region, which is formed by a very much eroded plateau of volcanic tuff.

Below the mouth of the Embalau River follow some other large southern tributaries, such as the Boenoet River, the

Embahoe- and the Silat Rivers, coming down from the Madih-plateau, with elevations of about 1000 meter.

Below the Silat River the Kapoeas breaks through a range of hills, which forms a kind of barrier, enclosing the basin of the Upper Kapoeas. Through the Upper Kapoeas-basin the main river flows very slowly, with innumerable serpentines, causing, in the wet season, regular inundations on a very large scale. In fact the numerous Batang Loepar Lakes are nothing but backwaters of the Kapoeas which now and then, but by no means every year, become entirely dry, and are then placed under cultivation by the natives. The same is the case with many more such lakes and swamps on both sides of the river.

Immediately below the hilly barrier, the Kapoeas River is joined from the South by the largest of all its tributaries, the Melawi River. This latter comes down from a large basin, the south-eastern corner of the Kapoeas-region, bounded on the north by the Madih-plateau and on the south by a very important region of high mountains, which separate the Melawi-basin from the numerous rivers running southwards to the Java-Sea. One of the highest peaks of this range, and at the same time of Dutch Borneo, is Mount Rajah, 2270 meter above the level of the sea.

After being joined by the Melawi, at an elevation of only 28 meter above the sea, the Kapoeas becomes a majestic stream, flowing slowly through the immense plain to the Indo-Chinese Sea, receiving, from the right and the left, numerous larger and smaller tributaries. Below the Island of Tajan, where its width has reached 1600 meter, the river begins to form a large swampy delta, covering an area of about 150 square geographical miles. The largest and most northern branch of the delta is the Little Kapoeas, on the southern bank of which is situated, about four geographical miles from the mouth, the town of Pontianak, the capital of the Residency of Dutch West-Borneo, and opposite on the right bank, the so-called Malay Kampong, the residence of the Sultan of Pontianak. So low and flat is the country that the tide is recognizable as far up the river as Sanggau, the residence of the Controleur of the district of that name.

The alluvial delta of the Kapoeas is almost entirely covered with a dense jungle of Mangrove, Screw-pines (*Pandanus*) and Nipa-palms, which latter almost exclusively border the different arms of the river-delta. Only here and there is this wilderness interrupted by small native rice-plantations or »ladangs", as they are generally called, with a few very primitive huts, the temporary abodes of the sparse scattered Malay population.

The more elevated interior is almost uniformly covered with high forest, interspersed with the settlements and plantations of the Malay and Dyak population, and to a very great extent with abandoned ladangs, which are again taken possession of by a luxurious jungle- and forest-vegetation. With the exception of the higher slopes and summits of the mountains and the valleys along the unnavigable parts of the rivers, it is far from easy, throughout the whole Kapoeas-basin, to find a space covered with really virgin forest.

There is but very little agricultural enterprise on the part of Europeans in the country, though the fertile soil, especially higher up, is adapted for tobacco- and coffee-farming. The population is, as a rule, extremely spread over the vast territory, and their settlements are restricted for the most part to the banks of the rivers, which latter form the only practicable highways of the country.

The aborigines of the Kapoeas-basin are the Dyaks, forming numerous tribes with but little, if any, political organisation. This is the reason, why the Malay population under their Sultans, Panembahans, Pangerans and whatever else all the still inferior lilliput princes may be called, have slowly succeeded in pushing the Dyaks back to the remote parts of the country, and in getting complete supremacy over those who did not mind keeping their abodes amongst the Malays, or even became Mohammedans and mixed entirely with the latter. At present the banks of the Kapoeas, from its mouth to Poetoes Sibau and of the lower parts of the larger tributaries are populated almost exclusively by Malays, who form, with the largely represented Chinese race, the mercantile element of the population. The Dyaks, on the other hand, are principally engaged in farming, though they produce little more than is absolutely required for their own needs, and in gathering the produce of the immense and almost inexhaustible forest, especially rattan, India rubber, and resin from the Dammar-tree. These products are bought up by Malay traders who are in possession of the intermediate trade, and sold to the Chinese merchants. These latter are the only great merchants in West-Borneo, possessing important factories at all the important places on the Kapoeas River, and having their own steamers running weekly up and down the river between Pontianak and Boenoet, and even across the Chinese Sea to Singapore.

The Dyaks live in very large houses built on high posts about 15—20 feet above the ground, each house containing from ten to forty separate rooms for as many different families. In many cases a single house of this description forms the whole settlement, but generally two or more houses are built close together, forming a so-called kampong, which by preference is situated on a high river-bank. Although head-hunting is far from being abandoned amongst the Dyaks of the far interior, they are a very good-natured people and very fond of fun, singing and music, and their wedding- and harvest-festivals last a whole week or even longer. But the best of all, especially for the travelling naturalist, is that they are very honest and trustworthy people, who will never break an engagement. Stealing seems to be absolutely unknown amongst the Dyaks we have met with. They are excellent paddlers and carriers, and I always preferred Dyak workmen to Malay ones, though we had very willing and useful men among the latter too. The principal food of the Dyaks is rice, and rice-farming is one of their most important occupations. As the soil of a farm is generally exhausted after two or three years, a new lot must be cleared and the old plantation abandoned. .This is the reason why the country, to a great distance round the settlements, is covered with low jungle and half-grown forest, and why real virgin forest is rarely met with except at a distance of many miles from the river-banks. These jungles and clearings are wonderfully adapted for bird-shooting and for catching reptiles and insects, and the natives, especially the children, fishermen and huntsmen, will very soon engage in collecting all kinds of things — useful and useless — for the white naturalist.

Besides the sedentary Dyak tribes, I repeatedly met with the members of a very interesting people, the so-called Poenans. Although undoubtedly of the same origin as the Dyaks, they do not live in permanent settlements but roam about in the vast forests of the mountain-regions of the far interior, subsisting entirely upon wild fruits and vegetables, hunting and fishing being the only occupation of the stronger sex of this extremely interesting people. The few garments they wear are made of the bark of trees, generally of a species of *Artocarpus* or bread-fruit tree, and their ornaments, of which men and women are very fond, are made of leopard-teeth, twisted and plaited vegetable fibres, wooden arm-rings, and very heavy ear-rings of copper. Their abodes are small, primitive sheds of palm-leaves in the forest and especially the numerous caves under overhanging rocks in the mountainous parts of the interior. The men are wonderfully adept in the use of their long blow-pipes and small, poisoned arrows and in that of the parang, a kind of sword, and are fond of head-hunting. As soon as the game of the forest in the vicinity of their temporary abodes begins to get scarce, the Poenans move to another place. Their only furniture consists of a few mats for sleeping upon, and some iron cooking pots. It is not very easy to make friends with these people, as they avoid as much as possible any intercourse with white men and the only means of overcoming their shyness is to present them with tobacco, which males and females are very fond of. Some of the once wandering Poenans have recently settled near the Dyaks and adopted their mode of life. In the Upper Mandai valley I had an opportunity of visiting some of those Poenan settlements and had the pleasure of making friends with their interesting inhabitants at the cost of a few handfuls of chewing-tobacco and small tin boxes full of glass beads, and after becoming thoroughly acquainted, they were very nice and kind people indeed. Another Poenan settlement is the large family-house at Nanga Era on the Upper Kapoeas, where I once spent a very pleasant evening on my journey from Nanga Raoen to Poetoes Sibau on the Kapoeas.

After a pleasant sea-trip I arrived at Batavia on November 1st. 1893, and was very kindly received by my excellent friend Dr. Vorderman, the well-known Dutch Ornithologist of the Malay Archipelago. I was very anxious, of course, to see his splendid collection of birds, consisting of nearly 2000 skins, all carefully preserved in tin cases to keep them from moisture and insects 1).

During my three weeks' stay in Java I was fortunate enough to make an excursion to Mount Gedeh and to obtain, on the inner edge of the crater, a specimen of the rare *Merula javanica*, besides a number of other birds.

On November 17th. I left Batavia, accompanied by Doris, one of Dr. Vorderman's collectors and a Javanese cookboy, and arrived at Pontianak on November 19th. In the hospitable home of Mr. Tromp, the Resident of Dutch West-Borneo, I made the acquaintance of Dr. Hallier, the Botanist of our expedition. Dr. Hallier, who had been three

---

1) The whole collection was presented last year by Dr. Vorderman to the Leyden Museum, and an enumeration of the specimens will be published in this periodical as soon as possible.

months in Borneo before my arrival, had just returned from a trip to Sambas, where he had ascended Mount Semedoem with Dr. Nieuwenhuis, and paid a short visit to the Island of Lemoekoetan [1]).

Mr. Tromp, the organisor of the expedition, did his utmost to insure the success of the enterprise. As he was just starting on a trip up the Kapoeas to Poetoes Sibau, he proposed to take us up to Smitau, which place was to become the head-quarters of the expedition. A few days after my arrival at Pontianak we left this place, Dr. Hallier on board of the Government steamer »Djambi", and myself, as the guest of the Resident, on board his steam-launch »Karimata". The rainy season, lasting in this region from October to April, had set in very vigorously, and consequently the water was very high, covering the lowland to a great distance on both sides of the river. Steaming throughout the day and night, we reached Sanggau at the mouth of the Sekajam River the next morning, and, late in the evening of the following day, Sintang, at the mouth of the Melawi River. At this very important place the Dutch Government is represented by an Assistant Resident, then Mr. Snellebrand, and a small garrison, established in a fort which dominates the Kapoeas as well as the Melawi River.

The next morning we steamed on again. The river had become much narrower, its water was as brown as coffee and milk, and we had to keep a sharp look-out day and night for the numerous floating logs of wood coming down the river with the current. The landscape began to look hilly, and every now and then at a turn of the river we had a glimpse of Mount Klam, a very steep, bulky and flat-topped mountain not very far east of Sintang. The monotonous forests on the banks were now and then interrupted by a Malay settlement, almost hidden away behind plantains and cocoa-nut palms, and small ladangs (plantations). Late in the evening of the same day we arrived at Smitau, the residence of the Controleur of the Upper Kapoeas-basin [1]).

---

[1]) Some reptiles and insects were collected on Mount Semedoem, and a few marine shells on Lemoekoetan. The latter have already been mentioned by Schepman in his treatise on the Mollusca of the expedition. (N. L. M. Vol. XVII, p. 162).

On the next morning our luggage and provisions were landed and taken to a large, comfortable house, built for the use of the expedition by the Controleur, Mr. van Velthuysen. Then we went on again with our two steamers, accompanied by Mr. van Velthuysen in his steamlaunch »Poenan", to Poetoes Sibau, where the Resident had to settle some questions with the Dyak-chiefs of the Upper Kapoeas, while he wished to take advantage of this occasion to introduce the members of the expedition to those chiefs.

After spending some very pleasant days and with a good impression of the numerous native chiefs we had met with, we returned on board the »Djambi" to Smitau, which is a very insignificant Malay village with some very poor-looking Chinese shops.

As soon as possible I began my collecting work in the surroundings of Smitau. Besides my huntsman Doris from Batavia I had an excellent assistant in the person of Max Moret, a colonial soldier of Swiss origin, who added very much to the success of my work, and from the Controleur I had obtained three Malay policemen who, after some training, became valuable huntsmen.

Unfortunately the lowlands round Smitau were entirely inundated, and it was only with the aid of small sampans (canoes) that we were able to penetrate the forest. The water had covered the ground to such a depth that in some places the tops of the trees were taken for shrubs, and collecting was reduced to birds and tree-frequenting mammals, such as Monkeys, Squirrels and Tree-shrews

---

1) This vast district has since been divided into two, and a second Controleur stationed at Poetoes Sibau.

(*Tupaia*) while fishing was entirely out of the question and but very few reptiles could be obtained.

In order to get more suitable collecting grounds, Dr. Hallier and I removed medio December to the southern foot of Mount Kenepai, a mountain west of the Batang Loepar Lakes and not very far distant from the frontier of Sarawak. Until shortly after the New-Year I resided in Roema Manoeal, a large native house, inhabited by 16 families of Kantoek Dyaks. The more elevated country made a far more favorable collecting territory than the inundated plain, and in spite of the heavy rains my collections increased very rapidly.

At the beginning of January 1894 Dr. Hallier returned to Smitau, while I removed from Roema Manoeal higher up to the south-western slope of the mountain. There, at an altitude of 550 meter above the level of the sea, I pitched my tent close to a lovely spring and had a hut built for my people. The slope of the mountain was very steep and entirely covered with high forest, in which creepers and numerous large boulders of rocks made hunting a very tedious work, and many valuable objects, which after much trouble we chanced to have a shot at, were lost between the rocks or in an inaccessible ravine. I had the greatest trouble in getting our mammal- and bird-skins dry. Clear, sunny days were extremely rare, for, whenever we had no heavy showers, the flanks of the mountain were thickly covered with mist, and so moist was the air that even the objects dried near or over the fire, were wet again the next day. Very often we had the pleasure of meeting with Orang-oetans which are not at all rare on Mount Kenepai up to an altitude of 700 meter, and their nests were rather numerous even in the immediate vicinity of our camp.

Several times my hunting excursions led me to the top of the mountain, a very steep, isolated cone which, on clear days, offers a splendid view over the greater part of the Kapoeas plain. It required a steady climb to reach the top, and wishing to make the ascent more comfortable, I ordered a regular path to be made with steps of cross-sticks and rattan ropes attached to the trees along it.

About 100 meter below the summit the trees become gradually lower and their trunks, as well as the large boulders and rock-walls, are entirely covered with moss, while the top itself is densely covered with shrubs, amongst which I found very fine Rhododendrons covered with most lovely bunches of red flowers. The brushwood was almost entirely filled up with thick clusters of moss, through which we had to force a passage by creeping along the ground through a kind of tunnel, while innumerable monkey-cups (the urn-shaped petioles of a large climbing *Nepenthes*) poured their water down upon us.

It was a real blessing, after having reached the top, to enjoy the long needed magnificent sun-shine, while a light breeze spread an agreeable coolness. The immense view we enjoyed from this elevated spot, 1136 meter above the level of the sea, was really wonderful, as it embraced the whole basin of the Upper Kapoeas. A red-throated little Humming-bird (*Aethopyga Temmincki*) and numbers of buzzing bees and bright-colored butterflies were flying from flower to flower, and some Swiftlets (*Collocalia*) swept along the almost perpendicular rock-walls which, on the north, support the rather long but very narrow platform. After spending a couple of hours on this sunny and lofty spot, and enjoying the beautiful scenery, we left the summit and returned to our damp forest-station.

Although my collections increased considerably during our stay at this mountain-station, and all of us did their very best to get the fauna represented as completely as possible, I cannot say that many species were obtained in this elevated region, which could not have been obtained as well in the lower country. The result of my investigations on the Kenepai is that the mountain is not high enough to yield such typical mountain forms as are found in the higher regions of Kina Balu and the higher mountains of Sarawak, such as Mount Mulu, Mount Penrisen, Mount Dulit and others.

On February 3rd. we left Mount Kenepai and returned to Smitau, where I dried and packed up my collections, which had suffered very much from damp, and sent them off to Europe.

In the meantime the other members of the expedition had arrived, and on February 26th. we removed altogether to Nanga Raoen on the Upper Mandai River.

Our five bidars (large rowing boats provided with roofs of palm-leaves) and a few native sampans formed a respectable flotilla, taken in tow by the Government's steam-launch »Poenan". The current of the river being very strong, we proceeded but slowly, and did not reach the mouth of the Mandai River before late in the next night. The water being too shallow for the steamer, we had to take to the oars, and our Malay and Dyak rowers had hard work, especially higher up the river, where the current was sometimes very strong, and we had many anxious moments in traversing the roaring rapids we met on our way from time to time.

After five days' steady rowing we arrived at Nanga Raoen, a settlement of Oeloe Ajer Dyaks, consisting of two large houses, situated on the left bank of the river. The larger of the houses, supported by 568 very high posts and having a length of nearly 500 feet, is inhabited by the respectable number of thirty-nine families, the smaller one by nine families only.

After being introduced to the people by Mr. van Velthuysen, who had kindly accompanied us up the river, we immediately built a house of our own on a suitable place on the high river-bank. Here it was understood that Dr. Nieuwenhuis would take up his abode to look after the large stock of provisions and to form a center for us all during our stay in the Mandai-region, and to enable us to take advantage, if necessary, of his medical assistance.

The surroundings of Nanga Raoen are very picturesque.

The Mandai valley near the settlement is tolerably wide and in part very swampy on account of the yearly inundations, caused by the river, which flows in great windings through the plain. The higher parts of the valley and the foot of the surrounding mountains are covered with rice-plantations (ladangs) and brush-wood or even high forest, which has taken possession of the exhausted, abandoned old ladangs. The small plain of Nanga Raoen is surrounded on three sides by a number of tabular mountains of an altitude of 1000—1300 meter, and by very steep or even perpendicular flanks supporting a thickly wooded plateau.

On the East is Mount Mirau, on the South, at a very short distance behind the kampong, the Liang Agang, and west of it, somewhat in the back-ground, Mount Ami Amit, the northern termination of the Liang Koeboeng-range, crowned with very grotesque looking, huge masses of perpendicular, barren rocks. To the West, somewhat farther down the river, stands the most imposing, though not the highest, of all the surrounding mountains, Mount Tiloeng, the northern end of a long range with a very extensive flat top, supported all round by perpendicular bare rock-walls, rendering the summit almost inaccessible even to the most daring Poenans. On the southern part of this plateau stands a large solid mass of rock, likewise with a flat top and almost perpendicular walls. This peculiar ornament renders Mount Tiloeng very recognizable throughout the whole basin of the Upper Kapoeas. This curiously shaped mountain is sacred in the mind of the natives of nearly the whole Upper Kapoeas-region, considered as it is to be the abode of the souls of the deceased Dyaks. According to the tales of the natives at Nanga Raoen a small lake must exist on the wooded top, containing a kind of fish, but although I had a fair view over it from the much higher top of the Ami Amit, I could not see anything but dense forest which seems to cover the whole plateau.

All these tabular mountains — and there are many more in the neighbourhood — must be considered as the remains of an extremely large, old plateau of volcanic tuff, and the valleys between as the work of the eroding power of numerous roaring rivulets which form as many southern tributaries of the Mandai River.

One of these tributaries is the Raoen River, draining the valley between the Liang Koeboeng-chain and the Tiloeng-range. It falls into the Mandai River below Nanga Raoen, and this latter name means, in fact, nothing but mouth of the Raoen. About a mile above its mouth it receives from the east the Siniai River, a small but very impetuous torrent, which drains the narrow and very sharply cut valley between the Liang Agang and the Liang Koeboeng-chain.

Being very anxious to get a chance to explore a region in Dutch Borneo above the altitude of 1500 meter, I was very much pleased to take the advice of Resident Tromp and to choose for that purpose the Liang Koebang which, according to his manuscript map of the Topographical Survey, had a height of 1825 meter. After a few days' stay at Nanga Raoen, and having secured two guides from that place, I began the ascent of the Liang Koeboeng-range. The ascent of the very steep flanks of the northernmost top, the Ami Amit, with my voluminous outfit and a large stock of provisions, proved to be extremely difficult, no path whatever leading through the dense mountain forest, which, hitherto, had been visited only by some Poenans in search of rattan and dammar. It was only cutlass in hand that our guides were able to open a narrow path for the heavily laden carriers, and it was only after many long hours of hard work that we reached the western foot of the perpendicular rock-wall which flanks all round, at an average height of 200—300 feet, the almost inaccessible top-platform of the mountain.

The western slope of the mountain, the basis of the huge bastion-like rocky plateau above us, was covered with large boulders of rock, and roaring torrents, fed by numerous waterfalls from the top-platform, ran down deep ravines to the valley of the Raoen River.

Forced by one of those ravines to keep close to the rock-wall to our left, we reached, at two o'clock in the afternoon, a high waterfall, behind which the overhanging wall formed a long gallery. Following this gallery for a while, it suddenly spread out, about 10—30 feet wide and from 10—20 feet high, and extending for a great distance under the rock above us. As this grotto was quite level and absolutely dry, I at once decided to make it my temporary hunting station. This resolution was loudly approved by my huntsmen and carriers, who soon dropped in, almost wearied to death, their shoulders cut by the strings of their heavy burdens, and their bare legs and feet almost black with bush-leeches.

In the gallery we found very recent fires and, scattered over the ground, some skulls and other bones of wild animals such as Monkeys, Boars, Kidangs (*Cervulus muntjac*), and teeth of Rhinoceroses which clearly proved that this place must very recently have been the abode of some wandering Poenan-families. From this fact our station received the name of »Poenan-grot."

After many vain endeavors, my guides happened at last to find a place along which we could reach the top platform above our grotto. There a sight awaited us which drew exclamations of astonishment even from my native attendants! The not very dense and not too high forest consisted in part of magnificent, high-stemmed conifers which reminded me strikingly of our European firs (*Pinus sylvestris*) and of other species of pines. Trees and shrubs grew for the most part like Mangrove-trees on a tangled mass of roots above the ground almost as high as a man. The ground was covered knee-deep with splendid, green moss, a thick layer of which also enveloped the roots and even the stems of the trees to a height of 10 feet. Even young stems and the whole of the undergrowth had such a thick coating of moss, that one took young sprays for thick trees. Every moment the feet sank through the moss bedding into the entanglement of roots underneath, and in trying to save ourselves from the stumble hereby caused, one's arm not infrequently went right through the mossy covering of a shoot as thick as a man's arm that we had taken for a thick tree.

A dense, cold mist lay deep over the wood, and it was only with great difficulty that we made a way through the dripping moss, in order to reach the precipitous northern edge of the plateau, and to enjoy the view to be obtained from there. We had, too, in the thick fog and the labyrinth of mossy columns, the greatest difficulty to keep together, for at a distance of 10 paces it was no longer possible to hear each other call; a gun-shot sounded like a pistol-shot, and one had not the slightest idea as to the direction from which the sound of the shot had come. All around was still as the grave, nature seemed extinct, no animal moved, no bird's voice was to be heard, no cricket chirped, no cicade pierced the air with its saw-like, characteristic call. Only the bush-leeches, those horrible pests of the mountain-forests of Borneo, fell bloodthirstily on us and forced themselves through every aperture in our saturated clothing.

As soon as we reached the edge of the northern precipice, we lighted a great fire, for, soaked as we were, we felt disagreeably cold in spite of a temperature of 20° C.

According to my hypsometer, the plateau had here an absolute height of 1135 meter, while the »Poenan-Grotto" is only 784 meter above sea level. The southern edge of the plateau, which is divided across in the middle by a saddle into two almost equal parts, is about 1200 meter high and descends perpendicularly on to a deep saddle which separates it from Liang Pata situated to the south of it, and also makes part of the Liang Koeboeng-range.

Mount Liang Pata is about 50 meter higher and has on its northern extremity, just opposite the southern end of the plateau above our grotto, a very striking, completely isolated mass of rock about 30 meter high, which reminds one of an old weather-worn, gray watch-tower, and both it and the rock-hump on the plateau of Mount Tiloeng are visible from a great distance in the surrounding country, even as far distant as Mount Kenepai on the northern edge of the Kapoeas plain.

These and similar masses of rock visible from our plateau are so many proofs that the immense lava-plateau must at one time have been much higher than it is now, and in the course of time must have undergone a uniform horizontal abrasion. The real Mount Liang Koeboeng, still farther to the south, is only 1322 meter high, the height given in Resident Tromp's manuscript-chart, viz. 1825 meter, is therefore a clerical error, an error which proved of serious consequence for me, with regard to the interesting mountain-fauna which I had expected on such an elevation.

Towards midday the fog cleared for about half an hour and for a moment we had a magnificent view of the wide Mandai valley and even over the Kapoeas plain to the mountains which presumably form the watershed between the Kapoeas and the Mahakkam which flows toward the East coast. Unfortunately the view and the warm sunshine were but of short duration, for soon clouds of thick mist rising out of the valley rolled round and over the plateau, and in a moment it was raining in torrents, so that we had to start on our descent to the grotto wet to the skin. We were not much more fortunate on later visits to this region of fog, and the plateau where, on account of its peculiar flora, I had expected to find another fauna, provided me with but very few zoological objects of special interest.

My stay in the grotto, which was a model of a well-appointed hunting station, lasted from March 10th. to the beginning of May. Hunting in the mountain forests was, although exceedingly fatiguing, very productive. The collections were enriched daily by specimens not previously obtained, among them for example such animals as *Sciurus Whiteheadi*, *Calyptomena Hosei*, and *Mesolophus montis*, which were hitherto known only from Mount Kina Balu and the higher mountains of Sarawak and which I had not expected to find south of the Kapoeas plain.

At the beginning of May a start was made with the forwarding of the baggage back to Nanga Raoen, and on May 5th. I left my lofty hunting grounds, on which I had spent some of the most interesting months of my journey. A few days later Dr. Hallier, who had stayed with me for a short time in the Poenan Grotto, left Borneo on account of persistent fever, and returned to Java with rich botanical treasures.

At Nanga Raoen, where, in the meantime, Dr. Nieuwenhuis had collected numerous fishes and butterflies for me, I stayed a fortnight longer, to devote my attention to the fauna of the Mandai valley. I then removed to Poetoes Sibau, whither Dr. Nieuwenhuis had preceded me, and where also Professor Molengraaff was expected, in order to concert with us as to a journey to the Mahakkam River. As it proved, however, that this journey which, if circumstances were favorable, was to be continued to the East coast, could not be entered upon before the middle of June, I was obliged to give up all idea of taking part in it.

In order to make the most of the time remaining to me, I now proceeded with my entire establishment up the Sibau River to Poelau, the only inhabited spot of the entire Sibau valley, where I set up a new station. Here I stayed for a month and, inter alia, I made a very romantic ten days' excursion up the river, the higher reaches of which are extremely wild, and fairly abound in rapids. The fauna of the Sibau valley does not differ from that of the Kapoeas plain, and even the upper reaches did not yield a single mountain form. Two months later, towards the end of July, I left Borneo and returned by Singapore, Deli (East coast of Sumatra) and Batavia to Holland.

After my return to Europe my Assistant MORET did, during the months of August, September and October, some collecting work in the valley of the Ketoengau River and visited for a second time Mount Kenepai, and during the three following months he made a small collection at Pontianak.

This, briefly, is a picture of my zoological field of labor which covered only the district of the Upper Kapoeas. As the opportunity which we had of travelling in this part only seldom offers, I considered it desirable to take the utmost possible advantage of it, instead of devoting part of the time to the coast-region and the lower reaches of the river which, moreover, have been often visited.

The result of this limitation of my field of labor is, it is true, that numbers of animals which occur only near the sea-coast do not figure in my collections. This void is especially noticeable in the department of ornithology. In my collections there are, for example, hardly any of the numerous species of waders and water-birds, among them many migratory birds from the north of Eastern Asia which are accustomed to take up their winter quarters in the great lower river-reaches and coast districts. A stay of two or three weeks would have sufficed to enrich my collections with at least fifty species of which I have now no specimens.

It is unfortunately not yet possible for me to give a review of the zoological results of the journey or to draw any conclusions whatever from the same. The greater part of the material is still awaiting its elaboration; some groups have been commenced with; at present, however, only the mammals, birds and mollusca are so far arranged and defined that an idea of the respective local fauna can be obtained. As regards the two first-named classes, Borneo can be reckoned at present as one of the best known islands of the East-Indian Archipelago. Apart from the earlier investigations of S. Müller, Schwaner, Croockewit, Semmelink, Diard, Wallace and many others, men of later and the latest times such as Hugh Low, Everett, Whitehead and Charles Hose have for years labored with the greatest success in the exploration of Borneo, especially in the north and north-west of the island.

Although I was able to work in an entirely uninvestigated region, my collections have hardly any new forms of mammals and birds to show; they go rather to prove that the fauna of the Kapoeas-region is practically identical with that of Sarawak and also of the rest of Borneo. Some mountain forms of mammals and birds, known originally from the mountain-forests of Sarawak, I found on the Liang Koeboeng, situated south of the Kapoeas plain, though I did not meet them on the much nearer Kenepai. As I had no opportunity of visiting mountains of more than 1200 meter in height, it must remain for the present an open question whether the peculiar high mountain species found at a considerable height on the Kina Balu occur also at similar altitudes in the south. It is, however, not easily conceivable that mountains 2300 meter high, like Mount Raja on the watershed between the Melawi and the Katingan, which latter river flows down towards the south coast, should harbour, if not the same, yet similar forms to those of the over 4000 meter high Kina Balu, the high mountain fauna of which show considerable conformity to that of the highest peaks of Malakka, Sumatra, Java and even Celebes. These few explanations suffice to show that here the vertical almost more even than the horizontal difference of certain animal forms is of quite important interest and could be easily employed as demonstration in speculative theories on the periods of rising and sinking of the Malay Peninsula and the Sunda Islands.

Considered from a geographical standpoint, Borneo belongs to the Malay-Asiatic fauna-region, which also embraces Java and Sumatra with the smaller islands belonging to them, and the Malay Peninsula and, as has been shown by recent investigations, to a certain extent also the highest peaks of Celebes. Although Borneo has a great many species in common with the districts named, especially with Sumatra, on the other hand a strong propensity to constant deviation is also apparent, a considerable number of forms presenting themselves which do not occur elsewhere, while others, e. g. the tiger, so frequent in Malacca, Sumatra and Java, are absent from Borneo.

We are indebted for a good review of the Mammals of Borneo to the Englishman CHARLES HOSE, who, in the zoological exploration of Sarawak, especially of the Baram valley and the surrounding mountains during a long series of years, has accomplished astonishing results.

Mr. HOSE, in his book on the mammals of Borneo, enumerates 146 species, a great number of which he has himself observed and collected. Several species, for whose occurence no authentic proofs can be furnished, will probably have to be dropped from the list, so that the number of the species thus verified is from 130 to 140. The number of species found by me in the Kapoeas-region amounts to 68, divided into the various families as follows:

| | |
|---|---|
| Simiae | 12 |
| Chiroptera | 17 |
| Insectivora | 5 |
| Carnivora | 10 |
| Rodentia | 17 |
| Ruminantia | 3 |
| Pachydermata | 3 |
| Edentata | 1 |
| | 68 |

This number, therefore, is equal to nearly half of all the authenticated species up to the present known from Borneo. As, however, it is not to be supposed that anything approaching all the species which occur in the Kapoeas region were found during my short stay there, the number mentioned above will, later, undoubtedly be very considerably increased.

Before bringing these brief observations on mammals to a close, I would draw attention to a peculiarity which is immediately apparent in glancing over them, viz. the great preponderance of the tree-dwellers. These include not only all the Quadrumana, Chiroptera and all Squirrels with the exception of the *Rheithrosciurus* which lives in the mountain forests, but also the numerous species of Tupaias, which form the bulk of the insectivorous mammals of Borneo, and also various Carnivora. Of the 68 species of mammals observed and for the most part collected by me, no less than 55 are tree-dwellers. This singular preponderance of tree-dwellers among the mammals, which occurs neither in the neighbouring Celebes, nor in Africa nor America in the same latitude, cannot, in the case of Borneo, be due to the presence of animals of prey living on the ground, for, as was mentioned above, these play no rôle there, and the tiger is even entirely absent. It is much more probable that this circumstance has been influenced in the first place by the forests which cover almost the whole island, and secondly by the vast annual inundations of the immense plains of the Kapoeas-region.

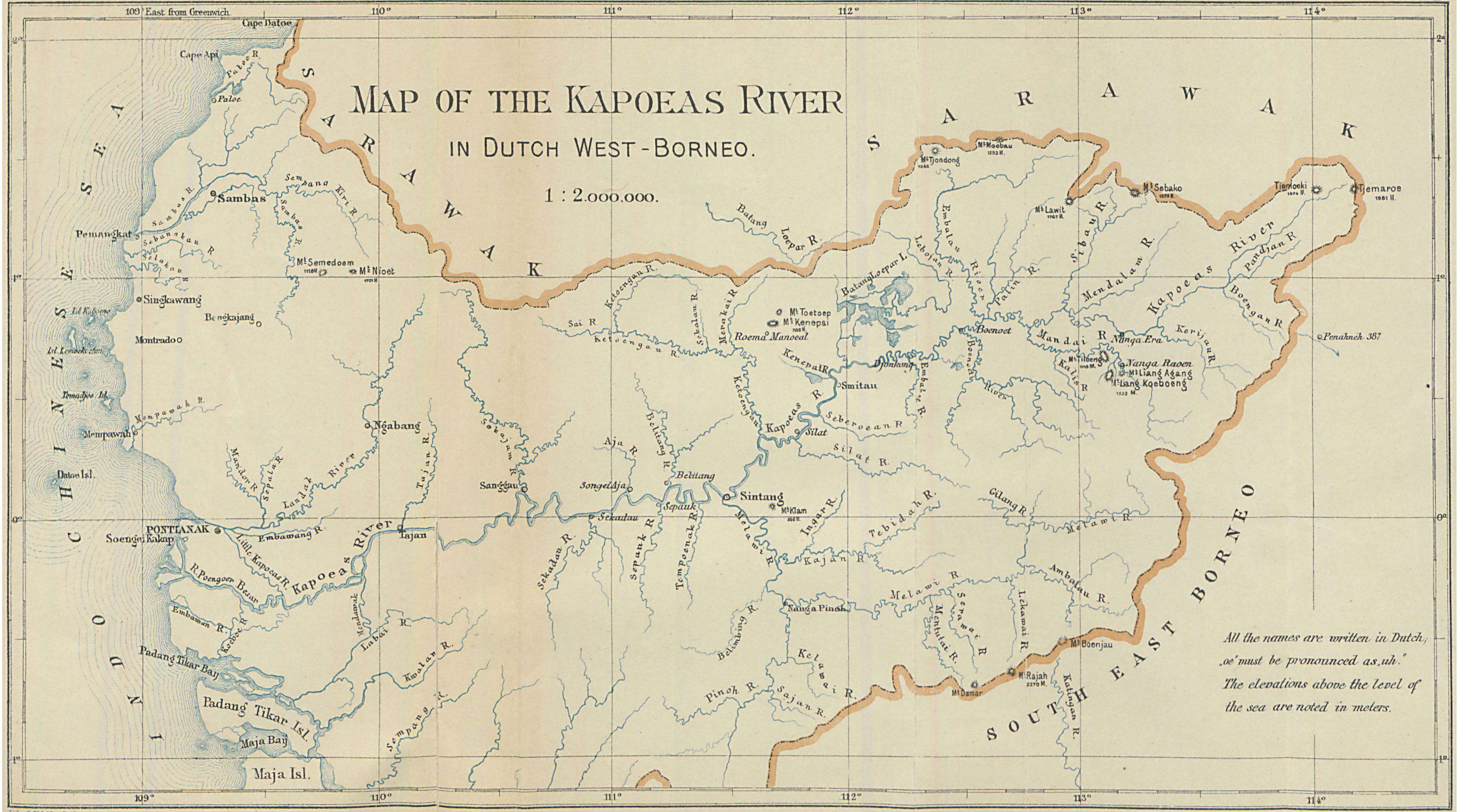
The birds collected during the expedition will be treated of by myself in the present volume and, if possible, immediately follow up Dr. Jentink's treatise on the mammals. For this reason I prefer to postpone the general notes on the Ornis of the Kapoeas-region and to place them at the head of my ornithological paper.

The collection of reptiles and batrachians is not very large, as but few specimens of this class are to be obtained in the mountain-forests, where a great deal of my time was spent. The same may be said of my fish-collection. As to my stations in the plain, Smitau on the Kapoeas River, which during the dry season probably would be a fine region for collecting reptiles and fishes, was just the contrary during my stay, which was in the rainy season. The most productive stations for these two classes of animals as well as for mollusca, crustacea, insects and worms were Roema Manoeal, Nanga Raoen, Poetoes Sibau and Poelau. The strange looking fact may be stated here that at Nanga Raoen, above the numerous rapids of the Mandai River, several species of sea-fishes, for instance a species of Sole and a *Hemignathus*, were collected.

It may interest our readers to know, that the work of the expedition is still being continued in Borneo, Dr. Nieuwenhuis having once more started for the Upper Mahakkam with a staff of collectors, and that, according to the latest news he will have left the Upper Mahakkam medio March with fine zoological collections and probably will now have reached the East-coast.

I cannot close this introduction without expressing my thanks in the first place to Resident Tromp, who most energetically and efficiently assisted us in every way and to whom undoubtedly a large share of the success of the expedition is due, and also to the high officials, the Assistant Resident Snellebrand and the Controleur W. van Velthuysen. To both the latter, as well as to the Controleur of Sanggau, Mr. L. C. Westenenk, Dr. Goedhuis at Sintang, and Captain Cajaux at Pontianak, and to my collaborators, especially Dr. Nieuwenhuis, I am indebted for many interesting contributions to my zoological collections. These latter have become the property of the Zoological Museum at Leyden.

Leyden Museum, April 1897.



# MAP OF THE KAPOEAS RIVER IN DUTCH WEST-BORNEO.

1 : 2.000.000.

*All the names are written in Dutch; „oe" must be pronounced as „uh." The elevations above the level of the sea are noted in meters.*

109° East from Greenwich
110°
111°
112°
113°
114°
109°
2°
1°
0°
S A R A W A K
S A R A W A K
CHINESE SEA
INDO
SOUTH EAST BORNEO
Cape Datoe
Cape Api
Patoe R.
Paloe
Sambas
Sambas R.
Sempana Kiri R.
Pemangkat
Sebangkau R.
Selakau R.
Mt. Semedoem 1118 M.
Mt. Nioet 1701 M.
Singkawang
Isl. Kaboeng
Bengkajang
Montrado
Isl. Lemoekoetan
Temadjoe Isl.
Mempawah R.
Mempawah
Datoe Isl.
Ngabang
Mandor R.
Sepatak R.
Landak River
Tajan R.
Sanggau
Sekajam R.
PONTIANAK
Soengei Kakap
Embawang R.
Little Kapoeas R.
Kapoeas River
Tajan
R. Poengoer Besar
Embawan R.
Koeboe R.
Padang Tikar Bay
Padang Tikar Isl.
Maja Bay
Maja Isl.
Mandawak R.
Labai R.
Kwalan R.
Sempang R.
Batang Loepar R.
Ketoengau R.
Sai R.
Sekalau R.
Merakai R.
Mt. Toetoep
Mt. Kenepai 1108 M.
Roema Manoeal
Batang Loepar L.
Kenepai R.
Smitau
Djonkong
Kapoeas R.
Silat
Seberoean R.
Silat R.
Aja R.
Belitang R.
Belitang
Songei Aja
Sepauk
Sekadau
Sekadau R.
Sepauk R.
Tempoenak R.
Sintang
Mt. Klam 964 M.
Ingar R.
Melawi R.
Tebidah R.
Gilang R.
Kajan R.
Melawi R.
Nanga Pinoh
Belimbing R.
Pinoh R.
Kelawai R.
Sajan R.
Mentatai R.
Serawai R.
Lekawai R.
Ambalau R.
Mt. Boenjau
Mt. Rajah 2270 M.
Mt. Damar
Katingan R.
Mt. Tjondong 1242
Mt. Moebau 1253 M.
Embaloe River
Leboijan R.
Embaloh R.
Boenoet
Boenoet River
Palin R.
Mt. Lawit 1767 M.
Sibau R.
Mt. Sebako 1375 M.
Mendalam R.
Mandai R.
Nanga Era
Kalis R.
Mt. Tiloeng 1113 M.
Nanga Raoen
Mt. Liang Agang
Mt. Liang Koeboeng 1522 M.
Kerijau R.
Kapoeas River
Boengan R.
Pandjan R.
Tjemoeki 1674 M.
Tjemaroe 1881 M.
Penahneh 387
Metawi R.

Lith v. P.J. Mulder, Leiden.